# ISD Software Management Plan / Product Plan (SMP/PP) For Class B & C Software

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**Approved By: (signature)**
**Name:** Joe Hennessy
**Title:** Chief, ISD

| | |
|---|---|
| **Responsible Office:** 580/Information Systems Division (ISD) | **Asset Type:** Template |
| **Title**: SMP/PP for Class B & C Software | **PAL Number:** 1.2.6.1 |

**Purpose**

The purpose of this document is to provide a template for use in producing a SMP/PP for Class B and C mission software as defined in NPR 7150.2, "NASA Software Engineering Requirements." The template is a skeleton SMP/PP intended for use by ISD personnel as the basis for a project-specific SMP/PP.

**Scope**

This template applies to all ISD mission software. ISD mission software is typically in Class B or C, as defined in NPR 7150.2. (The NPR can be found at http://nodis.hq.nasa.gov/.)

**Class B: Non-Human Space Rated Software Systems**
**Class C: Mission Support Software**

**Style Conventions**

Text within the template that appears in this (style name = "Normal") style is equally applicable to all SMP/PPs and should be included without modification. All document section headings should also be included without modification, although their style names vary depending on outline level.

*Text in this style [style name = "TAILORING ADVICE"] within the template is advice on how to tailor the information in any specific section. As the plan is developed, the generic [TAILORING ADVICE] text should be replaced with material that applies to the specific project, or deleted if it is general advice.*

**General Tailoring Conventions**

All components of the SMP/PP table of contents must be addressed, but the level of detail is left up to the Team based on software complexity and the customer's needs and expectations. The length and level of detail of the SMP/PP should be commensurate with the scope and complexity of the project. Section headings may be added where necessary, but existing headings should not be modified or deleted. If a particular section is not applicable to the specific SMP/PP under production, that fact should be noted under the section heading, together with a brief explanation.

Some items of the table of contents are processes that must be included in the SMP/PP by reference to approved processes contained in the GSFC

Process Asset Library at http://software.gsfc.nasa.gov, or by direct inclusion in the SMP/PP. If new processes are included in the Plan, they must meet the criteria for each specific process specified in Appendix B of the Product Development Handbook.

The following disclaimer appears on all pages of the template: “Printed copies of this document are for REFERENCE PURPOSES ONLY! The only controlled copy of this document is located on-line at http://xxx.yyy.zzz”. This disclaimer should be modified to contain the appropriate URL, but should not be removed.

Finally, in the target Plan, this entire section (Document Header, “Purpose”, “Scope”, “Style Conventions”, “General Tailoring Guidelines”, and “Template Change History”) should be deleted.

**Template Change History**

| Version | Date | Description of Improvements |
|---|---|---|
| 1.0 | 8/23/05 | Approved by the ISD CCB. |

*[Name of Code xxx]* **Branch**
*(NASA GSFC Code 58x)*

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*[Mission Name (Acronym)]*

*[Software Project Name (Acronym)]*

# Software Management Plan (SMP) / Product Plan (PP)

**SMP/PP Version:** *[xx]*

**SMP/PP Date:** *[yy]*

**Software Manager:** *[Software Manager Name]*

Goddard Space Flight Center

Greenbelt, Maryland

National Aeronautics and
Space Administration

## SIGNATURES

**Prepared by:**

_____ _____

Aaa A. Aaaaa/58x Date

*[Software Project Name]* Software Product Development Lead

**Approved by:**

_____ _____

Aaa A. Aaaaa Date

Customer Representative

_____ _____

Aaa A. Aaaaa /58x Date

*[Branch name]* Branch/Head

*[Insert additional signatures of stakeholders as needed to document their commitment to this plan.]*

## PLAN UPDATE HISTORY

*[This table shows the update history for the SMP/PP. Insert version designations, dates, and descriptions for the various version of this SMP/PP, along with the numbers of updated pages for each version.]*

| Version | Date | Description | Affected Pages |
|---|---|---|---|
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*[The Table of Contents is generated from section headings. Highlight the table and press the F9 key to update it in the project-specific SMP/PP.]*

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# 1.0 Introduction

This document is the Software Management Plan/Product Plan (SMP/PP) for development of the *[software project acronym]* system.

The major goals for this document are:

(1) To describe **what** products will be delivered as the *[software project acronym]* system.

(2) To define **who** is responsible for producing the products.

(3) To describe the baseline **schedule** for completing the effort.

(4) To specify the estimated resources needed (**cost** and/or effort) to produce the software, as a function of time.

(5) To describe **how** and **where** the work will be carried out.

(6) To reach a mutual understanding and agreement with our customer and other stakeholders on items (1) through (5).

*[Use the paragraph above as is, or add project-specific information about the purpose of this plan.]*

## 1.1 Background

*[Include a brief description of what larger effort/activity this Product Development Team (PDT) is supporting (e.g., a high-level overview of the mission) and how this product fits into the larger picture. This should provide a context for the more detailed material to follow. If the product is a component of a larger system, include a diagram showing how the component fits into the system.]*

## 1.2 Document Organization

Section 1 of this document presents introductory material and an overview of the software system to be developed.

Section 2 (Customer Agreement) summarizes the requirements, deliverables, and other mutually agreed aspects of the relationship between the customer and the software project.

Section 3 (Software Management Approach) describes how the development process will be managed.

Section 4 (Software Technical Approach) describes the technical approach to developing, delivering, and maintaining the software products.

Section 5 (Product Control and Assurance) describes how configuration management will be performed and how the quality of the software system will be assured.

Appendix A (Acronyms) defines the acronyms and abbreviations used in this document.

Appendix B (System/Subsystem Classifications) provides the classification of the software system and subsystems to be developed, as required by NPR 7150.2.

Appendix C (Tailoring Matrix for Compliance with NPR 7150.2) shows the project's compliance with the requirements of NPR 7150.2, "NASA Software Engineering Requirements," and provides the tailoring information necessary for Independent Technical Authority (ITA) approval of variants, waivers, or exceptions to the NPR.

# 2.0 Customer Agreement

This section describes the *[software project acronym]* Product Development Team's (PDT) understanding of the products to be developed, the schedule for development, the resources required, and mechanisms for communicating with the customer. The purpose of this section is to expose these items to the customer as a means of negotiating and documenting a mutual understanding. The customer's signature on the signature page indicates agreement with this section.

## 2.1 Customer Identification

*[Identify the primary customer for the software to be developed. Normally, this will be the Mission Project or other organization that is providing funding for the development effort, has specified the requirements, and will be responsible for accepting the final software.]*

## 2.2 Customer Goals and Objectives

*[List the customer's primary goals and objectives for the software to be developed. Essentially this amounts to a very high-level statement of the major requirements, probably no more than one or two paragraphs. Also list any special things that the customer wants to accomplish (e.g. rapid turn around, new architecture, special COTS requirements, experiments, etc.) through the PDT's activities.]*

## 2.3 Customer Requirements

*[This section should reference (preferred) or list the high-level requirements specified by the customer, and should include any customer-specified standards or interface control documents (ICDs) with which the software system must comply. Do not include derived technical interface documents or databases here; reference them in Section 4.1.]*

## 2.4 Customer Schedules

*[Reference or list all customer-specified schedule requirements, including such items as documentation, releases and reviews.]*

## 2.5 Customer Deliverables

*[List the customer-specified products to be delivered for each phase of development, including software, hardware, licenses, documentation, etc. List any customer-specified delivery medium and method of delivery for all products listed. (Describe those media/methods that are NOT specified by the customer in Section 4.8. See GPR 6400.1 for details.) List any customer-specified product delivery destinations for all products listed.]*

| Deliverables by Phase | Medium/Method of Delivery | Delivery Destination |
|---|---|---|
| | | |

## 2.6 Acceptance Criteria

*[Reference (preferred) or describe the customer's criteria for determining when the product is completed (e.g., "When will the customer accept the product?"). This is usually demonstrated by having a satisfactorily completed acceptance test matrix/set of acceptance test plans. The customer's verbal acceptance is not sufficient.]*

## 2.7 Customer Training

*[Specify who (from customer organization) is to be trained, estimate how many are to be trained, and identify the location and nature of training.]*

| Customer Training Required | # | Location & Nature of Training |
|---|---|---|
| | | |

## 2.8 Post-Delivery Maintenance

*[Describe maintenance requirements as specified by the customer.]*

## 2.9 Customer-Supplied Elements

*[List any technical and resource-related elements supplied by the customer that will be used in the production, testing, packaging or delivery of the product. Do not include funding. Include interfaces, delivery schedule, medium of supplied items, and the person responsible on the customer side.]*

| Customer-Supplied Elements | Medium/Method of Delivery | Delivery Schedule | Person Responsible |
|---|---|---|---|
| | | | |

## 2.10 Customer Involvement

*[Specify how the customer will be expected to take part in the development process. Typically, the customer will participate in PDT meetings, technical reviews, and change control boards; will provide direction, and will witness acceptance tests. There may be other forms of direct interaction, such as regular status meetings, participation in working groups, analyst support in software test, etc. Include roles, responsibilities, authority, and accountability.]*

## 2.11 Customer Requirements Review & Update Process

*[Describe the process used to evaluate and approve changes to the customer requirements. Be sure to note that the PDT will be evaluating the changes to assure that they have the capability of providing the requested changes within the allotted resources and schedule. Approval authorities (those listed on the signature page) must be specified by name and title. It must be stated whether or not the approval authorities consist of the CCB. If the approval authority is the CCB, then the CCB process and membership must be described or referenced. If the approval authority is not the CCB, then specify the approval authority and describe or reference its process and membership. The original approval authority must also approve any changes.]*

## 2.12 Resources Needed

*[Identify who is responsible for the official budget for this software project. In many cases, the budget will reside with the Mission Project. If so, reference the customer budget documentation.*

*Describe (or reference) the process used to estimate the resource needs for this project. Include the list the parameters and/or rationale used to determine what resources are required (e.g., estimates of software functionality or size, a list of key activities, a list of necessary facilities and equipment). Specify the project's resource needs as cost in dollars ($) and/or effort in full-time equivalents (FTEs) or staff-years. Budget information should be provided by fiscal quarter, and must include civil service staffing as well as contractor support. Address any specific facilities or*

*any facility modifications required for use in development or testing. Include the following statement:]*

See Section 3.4 for detailed information concerning resources that will be procured.

*[Identify who is responsible for obtaining, monitoring, and controlling the budget within this software project. Describe the mechanisms that will be used to resolve budget issues with the Mission Project.]*

# 3.0 Software Management Approach

## 3.1 General Development Approach

*[Describe briefly the general philosophy that will be used to build the product, discussing such aspects as use of COTS, contractor involvement, schedule constraints, build/release approach, use of a particular development methodology or new technology, etc.]*

## 3.2 Work Breakdown Structure

*[All project products and services should be developed in the context of a work breakdown structure (WBS), which forms the basis for work planning, progress measurement, and reporting. Include a graphical or tabular representation of the project's WBS. Also include detailed descriptions of each of the activities in the WBS.]*

## 3.3 PDT Information

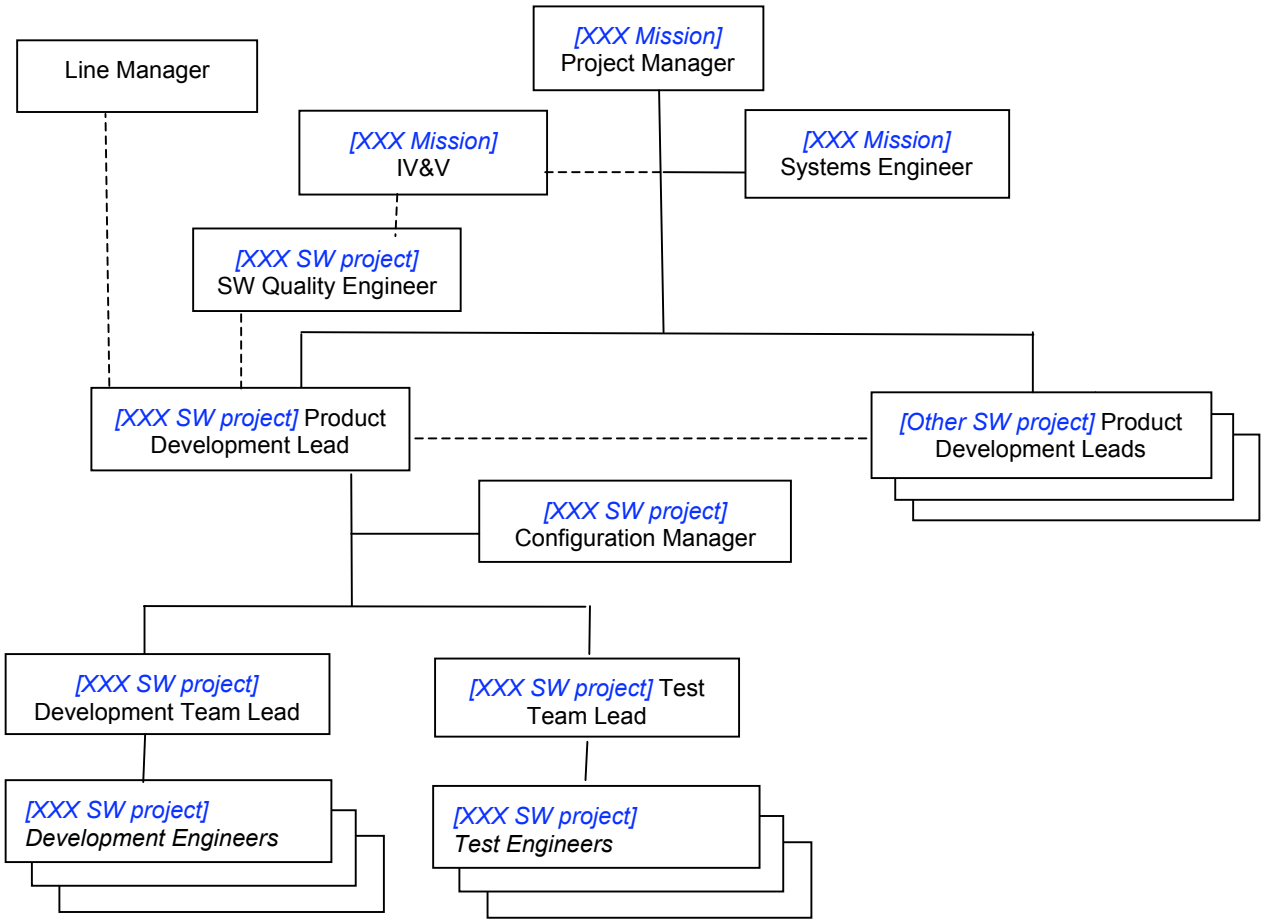
This section describes the roles, responsibilities and organization of the development team.

### 3.3.1 Product Development Team (PDT) Charter

*[Include a brief description of what this PDT is being asked to accomplish, including any time constraints or interface boundaries within which this PDT is expected to operate.]*

### 3.3.2 Organization

*[Include a diagram illustrating the organization of the PDT personnel and its activities. Show the relationship of the Product Development Lead (PDL) to the higher-level Mission Project organization for status and accountability, if applicable. Show how QA, CM, and IV&V activities are organized. The following diagram is provided as an example and should be modified to fit the project.]*




### 3.3.3 Roles, Responsibilities, Authority, & Accountability

*[Identify the authority and responsibility of each organizational unit within the PDT. Reference the Work Breakdown Structure used to assign work to PDT members. Assignments may be made by subsystem (e.g., Command & Data Handling, Planning & Scheduling) or by work function (e.g., testing). Include work assignments that will result in non-deliverable products (e.g., test tools) as well as deliverable products and services. State explicitly whether work assignments will be authorized using the WOA process (WOA Form 4-30) or whether work assignments are authorized by this SMP/PP.*

*For each of the following process activities, identify the PDT member and/or role responsible for the activity: (NOTE: Individuals responsible for these roles must be identified either in this Plan or in a separate, referenced document.)]*

| Process Activity | Responsible Role | Responsible Individual |
|---|---|---|
| Project Planning | *[Usually the PDL]* | |
| Project Monitoring & Control | *[Usually the PDL]* | |
| Risk Management | *[Usually the PDL]* | |
| Supplier Agreement Management (if applicable) | | |
| Requirements Development | | |

| Process Activity | Responsible Role | Responsible Individual |
|---|---|---|
| Requirements Management | | |
| Decision Analysis & Resolution | | |
| Technical Solution (i.e., design and implementation) | | |
| Product Integration | | |
| Verification | | |
| Validation | | |
| Configuration Management | *[Usually the CMO]* | |
| Measurement & Analysis | | |
| Software Assurance | | |
| Training | | |
| Software Process Improvement | | |
| Software Process Definition | | |

### 3.3.4 Stakeholder Involvement

*[Identify other organizations, teams, or groups necessary in developing, verifying, validating, or using the product. (NOTE: Customer stakeholders should be identified in Section 2.) Provide a matrix listing each stakeholder against the activities in which the stakeholder is involved. (See sample below.) Describe the purpose and rationale for each stakeholder's involvement, its importance to the project, and the authority and responsibility of the external stakeholder. Identify who is responsible on both sides of the interface, i.e., within the PDT and within the external organization, team, or group. Examples of interface activities include those of the flight software group to the flight hardware group for working compatibility issues; those of the Ground Data System to the Flight Operations Team for acceptance of the system; those of the PDL to line management, and those of the PDT to Safety and Mission Assurance, IV&V, and ITA.*

*Describe how stakeholder involvement will be monitored and documented, e.g., by publishing expected attendees at reviews/walkthroughs and recording attendance. Identify any additional project effort or materials needed to ensure that stakeholders become and remain involved (e.g. briefings to stakeholders, walkthroughs, hardcopies of review materials).]*

| PDT Activity | *[Stakeholder A]* | *[Stakeholder B]* | *[Stakeholder C]* | *[Stakeholder D]* |
|---|---|---|---|---|
| *[Name or brief description of activity X]* | *[Rationale, Responsibility, etc.]* | | *[Rationale, Responsibility, etc.]* | |
| *[Name or brief description of activity Y]* | | *[Rationale, Responsibility, etc.]* | | |
| *[Name or brief description of activity Z]* | | | | *[Rationale, Responsibility, etc.]* |

### 3.3.5 Training Plan

*[Identify any required task-specific training needed by PDT members and when it will be needed (e.g., prior to coding, before the start of system integration). Required task-specific training is defined as training that must be taken to acquire new skills or enhance current skills necessary to*

*the performance of a project role. This includes familiarizing PDT members with the SMP/PP; the methodology, standards, and design process used; the team records; the use of a nonconformance recording system, or training required when working in proximity to instruments or spacecraft, such as Electrostatic Discharge Awareness Training, Range or Launch Safety, Laser Safety, etc. Include a statement that ISD-required training will be expected for all staff with roles in the PDT and list the roles.*

*Describe your plan for getting each training item to the PDT, i.e., is the course available in-house or will it be purchased as vendor-supplied training? If any PDT member will receive training via mentoring, document how this will be accomplished. When training is complete, document it by keeping a list of completion dates and attendees for each course.]*

## 3.4 Procurement

*[Describe (or include by reference) all hardware and software purchase requirements in detail. Include any purchases necessary for facility modification. Describe (or reference) the procurement process that will be followed.*

*If you are using contractor support, describe the contractor selection process and contractor involvement in the software project. If special or unusual contracting arrangements are required, describe them. List the contractor name and contract number. Identify who has authority for interfacing with the contractor and describe roles and responsibilities on both sides of the interface. Describe (or reference) the process that will be used to monitor and control this contractor support.]*

## 3.5 Risk Management

*[If risks are described in a separate Risk Management Plan or within the Mission Project's Risk Mitigation Document, reference that document here. If no initial risks can be identified, state that. Otherwise, include the following information:*

*Identify the risk sources and categories for this project. Risk sources are fundamental drivers, either internal or external, that cause risks within a project. Examples include: uncertain requirements, a new type of development, a marginal design, new or unavailable technology, inadequate staffing or skills, and cost or funding issues. Risk categories are the "bins" used for collecting and organizing risks. Examples are: risks by lifecycle phase, by project management area (cost, schedule, performance, contractor, etc.), or by product type (e.g., subsystem). Define parameters to characterize these risks (e.g., severity, likelihood). Characterize each risk using these parameters.*

*Describe how risks will be continuously identified, analyzed, planned for, tracked, controlled, communicated, and documented during the project's life cycle. Risk management must be conducted in accordance with the NASA process and resources for Continuous Risk Management as found in NPG 7120.5, "NASA Program and Project Management Processes and Requirements" and NPR 8000.4, "Risk Management Procedural Requirements. Both of these documents are located at http://nodis.hq.nasa.gov/.]*

## 3.6 Software Safety

*[Describe the procedures for implementing the NASA software safety standard if any part of the software produced by this project is identified as safety critical. Include procedures for documenting and tracing software safety requirements through all software phases, reporting and resolving discrepancies with safety-critical software, and verifying and certifying the safety-critical components. See NASA-STD 8719.13B, NASA Software Safety, at http://www.hq.nasa.gov/office/codeq/software/docs.htm. Also see the NASA Software Safety*

*Guidebook, NASA-GB-8719.13, which is designed to help create a set of tailored activities and analyses that will meet the requirements of the Software Safety Standard. Software safety analysis verifies that the software contains no errors or deficiencies that could contribute to risks to people or property. If there is no software produced that is identified as safety critical, then state that.]*

## 3.7 Software Security and Privacy

*[The software project manager is responsible for requirements associated with the…*

- *Security of people and NASA assets,*
- *Security of information technology,*
- *Proper export of controlled hardware, technology, and data (including software), and*
- *Involvement of partners, contractors, and citizens of foreign countries.*

*If the project has a separate Security Plan, reference it here. Otherwise, describe the project's plans for addressing security and privacy considerations, both physically for the facilities involved and electronically for any computer systems being used either for development and testing or as a part of the final product. Address each of the items in the bulleted list above. Also provide input to the Mission Project Security Plan, as needed to comply with NPR 2810.1, Security of Information Technology, located at http://nodis.hq.nasa.gov/.]*

## 3.8 Independent Verification and Validation (IV&V)

*[The PDL shall provide the appropriate documentation and software information to the Mission Project Manager to assess the IV&V requirements for the mission. Once the IV&V requirements have been determined and documented by the Mission Project, the PDL is responsible for interfacing with the IV&V facility and providing any required support to the IV&V activity. Identify the IV&V support needed from this project and describe your plan for providing it.]*

## 3.9 Review Program

*[GPR 8700.4 and GPR 8700.6 define the procedures and guidelines for required Mission reviews and their applicability. The software PDT participates in, or contributes material to, required Mission-level Project or Program reviews (e.g., EPRs or IIRs), as needed. In addition, the PDL shall define, with the participation of the Product Manager, line management, the customer, and user groups, an appropriate set of software reviews as a resource to increase the probability of success. Describe the types of software reviews you plan to hold and the membership of the review boards. Software reviews may be combined to improve value or efficiency. However, when reviews are combined, review objectives from each shall be addressed to the level of detail required for the individual reviews.*

*Additional management (e.g., branch-level) reviews should be conducted for status reporting, staffing, budget review, etc. Describe the management reviews that are planned, their participants, frequency, and function.*

*Use Section 4.6 to describe the peer reviews (inspections and walkthroughs) that are planned for this project. Identify work products that will be verified by peer review in Section 4.5.1.]*

## 3.10 Overall Schedule

*[Reference (preferred) the overall, detailed schedule used to manage PDT activities. This schedule should include project planning, facility preparations, procurements, system development by phase and build/release, product delivery, software services; maintenance (if*

*applicable), and process activities (project planning, establishment of a CM system, software assurance, etc.). Be sure to include schedule dates for reviews, documentation, delivery of interface control documents (ICDs), tests, software releases, procurements, and external deliveries to the customer. Specify the parameters or rationale used as a basis for the schedule. The detailed schedule should include and be consistent with any customer-specified schedules for this project, as defined in Section 2.4. It should also be consistent with the life-cycle described in Section 4.2.1.]*

## 3.11 Status Tracking

*[Describe the method(s) that will be used to track status throughout the life cycle of this project. Methods may include:*

- *Earned Progress (e.g., Point Counting)*
- *Schedule charts with status indicated*
- *Module status checklists*
- *Test status matrices*

*Identify how frequently status will be updated, when it will be reported, and who is responsible.]*

## 3.12 Data Management (DM)

*[If there is a separate Data Management Plan for the project, reference it here. Otherwise, include the following information. See GPR 1440.7, "Records Control," and PAL#3.1.1.2, "ISD Guidance on Data Management and Process Configuration Management," for further information.*

*Provide a Master List of ALL project data, such as documents, meeting minutes, action items, status reports, code, correspondence, etc. Identify who is responsible for the each data type. Identify when, where, and how each data type will be collected, stored, distributed, and archived. Storage might be in a Project Library, PDL notebook, a project website, a controlled library, etc. If the data item will not be retained, state that fact. Note any privacy or security requirements on the data. Ensure this Master List includes project resources needed (cost and/or effort), schedule, and all related estimates and BOEs.*

*In the DM Master List, also identify the types of documents and data that will be configuration-controlled and when each type will be placed under CM. Include the document or database name, the date or version identification of the current version, the location of the documents or database, and the person responsible for the item. (NOTE: Any databases or web sites containing information directly under the PDT's control should contain a header identifying what is being viewed, as well as the date of the last change and the person responsible for its control.)]*

## 3.13 Project Measures

*[Based on the project's information needs and goals, identify specific measurement objectives -- and the measures that will be collected and analyzed to satisfy these objectives -- in each of the following areas:*

a. Software progress and cost tracking
b. Software functionality
c. Software quality
d. Software requirements volatility
e. Software characteristics

*In addition, projects that are required to be CMMI Level 2 must collect and analyze process measures for each of seven process areas: Project Planning, Project Monitoring and Control, Configuration Management, Requirements Management, Process and Product Quality Assurance, Measurement and Analysis, Verification, and Validation.*

*Table 3.13 lists the recommended measures for ISD Class B and C projects. Additional measurement guidance is provided at http://software.gsfc.nasa.gov/metrics.htm.]*

**Table 3.13: Recommended Project Measures**

| **Measurement Area** | **Measurement Objective** *[Sample objectives are listed below.]* | **Analysis** | **Measure(s)** **(Asterisk (*) indicates measure is required by the ISD Measurement Program.)** |
|---|---|---|---|
| Software progress and cost tracking | Ensure project schedule is within 10% of the planned schedule. | Compare planned vs. actual schedule; analyze deviations. | *Event dates (planned and actual)<br>(NOTE: Collect both milestone dates and process event dates.) |
| | Ensure product progress is within 10% of planned progress. | Compare planned progress points vs. actual progress points. | *Progress tracking points (planned and actual) |
| | Ensure project effort and costs remain within 10% of budget. | Compare planned vs. actual effort. | a. *Total Effort (planned and actual FTEs for civil servants and contractors) |
| | | Compare planned vs. actual costs. | b. Effort by CSCI (planned and actual)<br>c. Facility and equipment costs (planned and actual) |
| Software functionality | Deliver the required software functionality. | Compare planned vs. delivered by release or build. | Number of requirements in the release/build (planned and delivered) |
| | Ensure performance measures are within margins. | Compare critical performance measures against margins. | Memory utilization or timing by CSCI (planned and actual) |
| Software quality | Ensure product quality. | Compare expected vs. actual level of defects. | a) *Number of defects by severity (critical, moderate, minor) |
| | | Analyze responsiveness to detected defects. | b) Open and closed defects by severity<br>c) Length of time defects open by severity |
| | | Analyze responsiveness to action items. | Open and closed RFAs by length of time open |

**Table 3.13: Recommended Project Measures (continued)**

| Measurement Area | Measurement Objective *[Sample objectives are listed below.]* | Analysis | Measure(s) **(Asterisk (*) indicates measure is required by the ISD Measurement Program.)** |
|---|---|---|---|
| Software requirements volatility | Control requirements volatility. | Compare actual to expected level of requirements changes. | a) *Total number of (actual) requirements changes (i.e., sum of additions, changes, and deletions)<br>b) Requirements changes by CSCI |
| | | Compare actual to expected level of requirements TBDs. | c) *Total number of (actual) requirements TBDs<br>d) Requirements TBDs by CSCI |
| Project Planning | Ensure project is re-planned if current estimates exceed planning parameters by 20%. | Re-estimate planning parameters and compare to current estimates. | e) *Original and revised planning parameters (cost, effort, schedule, local size measure) by revision<br>f) Number of revisions to plan |
| Project Monitoring and Control | Ensure necessary project activities are performed. | Analyze responsiveness to action items | Number of open vs. closed action items |
| | Ensure project schedules are met. | Analyze occurrences and trend. | Milestone dates met vs. missed |
| | Ensure project risks are monitored and controlled. | Analyze changes to risk parameters and priorities. | Number of added, modified, and retired risks by severity |
| Configuration Management | Ensure configuration management is being performed as planned. | Compare number of changes to expected levels. | Number of changes to configured items |
| | | Compare planned vs. actual effort. | Effort expended in configuration management (planned and actual) |
| Requirements Management | Ensure requirements are being managed as planned. | Compare requirements changes to expected levels. | Number of additions, changes, deletions to requirements by CSCI |
| Process and Product Quality Assurance | Ensure software assurance is being performed as planned. | Compare planned vs. actual evaluations. | Number of evaluations (planned and actual) |
| Measurement and Analysis | Ensure project measures are collected and analyzed as planned. | (as listed in this table) | (as listed in this table) |

**Table 3.13: Recommended Project Measures (continued)**

| Measurement Area | Measurement Objective *[Sample objectives are listed below.]* | Analysis | Measure(s) **(Asterisk (*) indicates measure is required by the ISD Measurement Program.)** |
|---|---|---|---|
| Verification | Ensure verification activities are performed as planned. | Compare planned vs. actual numbers of peer reviews. | Number of peer reviews (planned and performed) |
| | | Compare actual vs. planned effort on peer reviews. | Time spent on peer reviews (preparation and review) |
| | | Compare numbers of defects found to expected levels. | Number of defects found (in peer reviews) by type |
| Validation | Ensure validation activities are performed as planned. | Compare number of planned vs. completed validation events. | Number of validation events (planned and completed) |
| Software characteristics | Support ISD model-building for future process improvement. | (None required at the project level.) | a) *Software project name<br>b) *Software domain (flight, ground, analysis/research, infrastructure, other)<br>For each CSCI:<br>c) *CSCI name<br>d) *CSCI Type (e.g., for FSW: C&DH, ACS, Science; for Ground: T&C, FDS, P&S, Science Lvl 0)<br>e) *Primary language (e.g., C, C++)<br>f) *COTS/GOTS/MOTS products<br>g) *Target hardware (e.g., PowerPC)<br>h) *Operating System<br>i) *Size (final)<br>j) *Units (in which size is measured) |

*Describe or reference the approach that will be used to collect, store, analyze, and report the project measures. Include information such as the formats/units in which the measures will be collected (e.g., SLOC); how the measures will be collected, by whom and when; where the data will be stored, who controls it, and how long it will be retained; how the data will be analyzed, by whom, and how often; and how the analysis results will be reported, to whom and how often. If any of this information is unique to specific measures, consider adding one or more columns to Table 3.13 to describe the details of the approach on a per measurement basis.*

## 3.14 Key Issues, Decisions, and Rationale

The PDL will maintain a log of the PDT's key issues, decisions, and rationale throughout the life cycle of the project. *[Reference the DM Master List, which must identify where, how, and when this log will be maintained. See Section 3.12.]*

## 3.15 Lessons Learned

*[Describe the process to be followed to ensure capture by the PDT of relevant lessons learned throughout the project's life cycle. Use or modify the following process steps:]*

- The PDL will query the NASA Lessons Learned Information System (LLIS, which is maintained at http://llis.nasa.gov ) and other knowledge resources at the beginning of each phase of the software development lifecycle to access relevant past experiences and knowledge that can be leveraged to reduce risk, improve quality and efficiency.
- The PDL will consider any significant lessons learned for inclusion in LLIS and submit those lessons, if appropriate.]
- The PDL will document final lessons learned and submit them to the GSFC EPG via http://software.gsfc.nasa.gov. These lessons learned should summarize the PDT's key recommendations for improving the development/maintenance process in future similar projects.

# 4.0 Software Technical Approach

## 4.1 Derived Requirements

*[Reference (preferred) or describe the requirements and/or specifications derived from customer requirements by the PDT and approved by the Customer, PDL and appropriate manager. These should include assumptions, interfaces, and performance information. Ensure that requirements are testable. Highlight requirements that will drive software design decisions, e.g., special timing requirements or checkpoint restart. If no additional requirements/specifications can be derived, just reference Section 2.3. Reference or describe the process used to validate these requirements.]*

## 4.2 Development Strategy

### 4.2.1 Development Life-Cycle

*[Discuss the life-cycle model that will be used (e.g., waterfall, spiral model, iterative development) and briefly describe how the model has been tailored for this project. Provide a diagram of, or otherwise describe, this tailored life-cycle. Include each life-cycle phase, the activities to be performed in each phase, the major products of the phase, and the "gates" (e.g., reviews or other milestones) that must be passed before the next phase or major activity can begin.]*

### 4.2.2 Development Process

*[Reference (preferred) or describe at a high level the development processes and procedures the PDT will use, including those for software integration and software/hardware integration.*

*The GSFC Process Asset Library at http://software.gsfc.nasa.gov is the repository for standard ISD and Branch-tailored processes and procedures. Tailoring of these processes and procedures is determined by the PDL with the concurrence of line management and the customer (typically a project manager or principal investigator). Tailoring factors include project characteristics such as the criticality of the application, the size of the PDT and user community, the degree of reuse, and other project specific factors.]*

### 4.2.3 Development Environment

*[Describe the development and test facilities, equipment, libraries, and tools. Include descriptions of each software verification environment that is to be established for the project, e.g., software testing environment, system testing environment, regression testing environment. Also include descriptions of each software validation environment, e.g., simulators for the operational environment, acceptance testing environment. Describe plans (such as back-ups) to prevent loss or damage to all of the products (including software, documentation and hardware) during all phases of development.]*

### 4.2.4 Make/Buy Approach

*[Identify which make/buy decisions will be made using a formal decision analysis process, such as a trade-study, that evaluates identified alternatives against established criteria. Reference (preferred) or describe any special purchasing strategies for items specified in Section 3.4. This may include strategies for use of COTS such as agreements for vendor modifications to address specific requirements. ( See GPR 5100.1 for additional information on procurements.)]*

### 4.2.5 Customer-Supplied Products Approach

*[Briefly describe the approach that will be used to integrate any customer-supplied items (as specified in Section 2.9) required for the development and test of final product. Identify any assumptions concerning these items or their integration.]*

### 4.2.6 Rights and Approvals

*[If new technology, open source software or commercial, government, or modified off-the-shelf software (COTS, GOTS, MOTS) is to be incorporated in the delivered software system, identify any approvals required for proprietary, usage, ownership, warranty, and licensing rights. Open source software licenses should be reviewed by the Center Chief of Patent/Intellectual Property Counsel before being accepted into software development projects. Identify any other regulated approvals or required certifications for system components.]*

### 4.2.7 Prototyping Approach

*[Describe any prototyping activities required to develop the product and the purpose of the prototype (i.e., "What specific questions are to be answered by the prototype?"). If the criteria to be used in evaluating the prototype are known, identify them here. Otherwise, itemize these criteria in the prototype's documentation.]*

## 4.3 Product Design

*[Reference (preferred) or briefly describe the design of the product the PDT is planning to produce. Describe how changes in design are incorporated and traced to changes in the requirements. Describe how the design will be traced to the customer-specified and derived requirements/specifications, (Sections 2.3 and 4.1, respectively). ]*

## 4.4 Build Approach

*Briefly describe your build approach, including:*

- *the development phases*
- *the sequence of versions/releases*
- *vendor/customer/ prototype elements to be integrated*
- *the requirements satisfied in each version/release*

*If a separate Build/Release Plan will be produced, reference it here.]*

## 4.5 Verification and Validation

### 4.5.1 Product Verification

*[Verification confirms that work products properly reflect the requirements specified for them. Identify the software verification procedures and criteria that will be used across the project's life cycle, e.g., peer reviews, inspections, re-inspection criteria, testing. List the work products that will be verified using these procedures and criteria (e.g., peer reviews or inspections of code; tests of code against requirements and design). Include peer reviews of software requirements and test plans in this list.*

*Describe the testing approach from unit testing through product delivery, including in-process and final inspection. Reference your test plans and discuss your testing approach for unit, build/release, and system testing; the composition of the test team (developers, independent, customer); the test environment; test data (simulator, supplied data, flight hardware, real data); and any related success criteria (particularly any from the customer for final acceptance—see*

*Section 2.6) Describe how changes in requirements and design are mapped to changes in test plans.*

*Identify where the actual software verification records (e.g., peer review records, inspection records, test records) and analyses of results will be documented. Identify where software verification corrective actions will be documented. Describe the corrective-action procedures themselves in Section 5.2.]*

### 4.5.2 Statistical Techniques

*[Unless the PDT determines a need for statistical testing of the product or other statistical methods, include the following paragraph in this section.]*

The PDT evaluated the need for statistical testing of the products developed under this SMP/PP and determined that statistical techniques are not required.

*[Examples of statistical techniques being used are (1) techniques to obtain reliability of hardware systems and (2) comparisons of output results after a platform language conversion. If statistical techniques are being used, then the procedure for their use must be documented.]*

### 4.5.3 Incoming Inspection and Test

*[For purchased items, including hardware and flight-critical components, document the Receiving Inspection Instructions to describe special receiving instructions and tests other than kind, count and condition.]*

### 4.5.4 Product Validation

*[Validation demonstrates that a software product or product component fulfills its intended use in its operational environment. Validation activities are performed on work products in every phase of the life cycle. For example, requirements validation might be performed via the SRR; a software design might be validated by a prototype demonstration. Methods of software validation include acceptance testing on the targeted platform, high-fidelity simulation, analysis against mathematical models, and operational demonstrations.*

*Identify the validation procedures and criteria that will be used across the project life cycle. List the work products that will be validated using these procedures and criteria, e.g., user groups reviewing requirements and prototypes, acceptance testing of each software release, operational demonstrations of the software product.*

*Identify where the actual software validation records (e.g., user group review records, prototyping records, acceptance test records) and analyses of results will be documented. Identify where software validation corrective actions will be documented. Describe corrective action procedures in Section 5.2.]*

## 4.6 Peer Review/Inspection Process

*[Peer reviews and inspections are the in-process technical examination of work products by the supplier's peers for the purpose of finding and eliminating defects early in the life cycle. Reference (preferred) or describe the procedures the PDT will follow to prepare for and conduct peer reviews/inspections, to document results, and to certify completion. Include in these procedures the use of checklists to evaluate the work products, the use of readiness and completion criteria, the tracking and closure of action items, and the recording of basic measurements for the review. Describe your plan for analyzing measurements and results from*

*multiple peer reviews in order to identify systemic problems and to improve the peer review process.]*

## 4.7 Documentation

*[Provide a documentation tree that lists, in hierarchical format, all controlled documents the PDT will produce throughout the project's life cycle. Include the SMP/PP and its subsidiary documents and plans, e.g., the Software Configuration Management Plan, Software Assurance Plan, and Software Maintenance Plan. Include all requirements documents, design descriptions, and user guides. Include the Software Test Plan and its component Software Test Procedures and Software Test Reports. See Chapter 5 of NPR 7150.2 for a list of project documents and document contents. Describe the contents of listed documents or state that they will conform to NPR Chapter 5.]*

## 4.8 Product Delivery

*[Reference or describe the process/procedure that will be used for product delivery. List the media and methods by which the various products are to be delivered to the customer. (Media/methods specified by the customer should be listed in Section 2.5.) State that products released to the customer will include a Product Release Letter listing the release number, the included capabilities of the release, and a description of any remaining nonconformances in the release.]*

## 4.9 Product Maintenance

*[Reference the Software Maintenance Management Plan (SMMP) or describe the process for post-delivery product maintenance, including processes for maintenance specified by the customer in Section 2.8 and any derived maintenance requirements (i.e., "How do you plan to meet the requirements specified in Section 2.8?"). Address responsibility for the maintenance. Describe the processes that will be used for handling maintenance requests, for doing work, and for product redelivery of custom, GOTS and COTS software, and hardware.]*

# 5.0 Product Control and Assurance

## 5.1 Configuration Management (CM)

*Describe how the PDT will manage the project's software, hardware, and documentation configurations and who has the change authority for each. Include identification of any CCBs and the items controlled or reference the Master List of project data (Section 3.12). If you use the Mission Project's configuration management process for any of these items, specify where Project procedures can be found. Describe the method used to uniquely identify versions of the software and the elements from which it is built. If on-line copies of documentation or software are considered the controlled copy, then the approval authority should control on-line change access. (NOTE: Identify CM procedures for test hardware and software in Section 5.3. Describe CM procedures for customer-supplied elements in Section 5.4.)*

## 5.2 Control of Nonconforming Products and Corrective Action

*[Describe the criteria and process for recording and correcting problems in a "minor" Nonconformance Reporting/Corrective Action (NCR/CA) system (e.g., a discrepancy/change reporting system). Include a description of the process used to evaluate the cause of the problem and to assess whether any changes need to be implemented to prevent future recurrences. The minor NCR system should include the version or release number where the problem was found and, ideally, the version number that includes the corrections. Any nonconforming products released to the customer shall be identified as such in the release letter, which shall describe the remaining nonconformance. The release number and the list of NCR's associated with the release identify Nonconforming products. Products with remaining nonconformance may only be released to the customer with proper approval. (After product delivery the Center NCR/CA system shall be used if no minor nonconformance system exists or if the nonconformance meets the criteria for a major nonconformance as specified in GPR 1710.1 for use of the Center NCR/CA system.)]*

## 5.3 Control of Test Software and Hardware

*[Describe anything (hardware and/or software) used to test the product. Describe how test software will be validated (i.e., how do you convince yourself that the simulator is working properly?). If the software used for testing is not the final validation, but is only used as part of a self-check, where neither the test software nor the product being tested is considered correct until the final results are correct, then describe that test capability and any associated limitations. Describe or reference the configuration management process used to ensure the appropriate version of the test hardware/software is used. Also discuss any inspection, measuring, and test equipment (IMTE) being used and any calibration requirements.]*

## 5.4 Control of Customer Supplied Products

*[Describe the method that will be used to check out or test the software or hardware supplied to you by the customer for inclusion into the product or for testing or packaging of the product. If a customer provides items for use by the PDT in the development/testing of the product, describe the process used to report any problems with the item(s) back to the customer. Describe the configuration management process for changes (initiated by the customer or the PDT) to customer-supplied elements listed in Section 2.9.*

*Include any other processes used to safeguard customer-supplied products. This section should address simulators, test data, software algorithms, software and/or hardware received from the customer.]*

## 5.5 Software Quality Assurance

*[Reference the project's Software Assurance Plan or describe the overall approach, criteria, and process for software quality assurance. Describe the interface and communication path between the project and the external organization providing software quality support. Specific project characteristics and risks influence quality assurance, and assurance planning should be tailored to reflect this fact. How will product evaluation and process monitoring be accomplished? What level of support will the project have from the center Software Assurance organization, Code 300?*

*Characteristics that should be considered include safety and mission criticality of the software, schedule and budget, size and complexity of the product to be produced, and size and organizational complexity of the development staff. Consider documentation standards, design standards, and code standards as well for inclusion in project standards.*

*For additional information, see the NASA Software Assurance Standard, NASA-STD-8739.8, and the NASA Software Assurance Guidebook. Both of these documents can be found at http://www.hq.nasa.gov/office/codeq/software/docs.htm.]*

# Appendix A: Acronyms

*[Include in this appendix all acronyms used in the SMP/PP. Following is the recommended format and an example of an acronym list.]*

| | |
|---|---|
| ARM | Automated Requirements Measurement |
| ATRR | Acceptance Test Readiness Review |
| BOE | Basis of Estimate |
| CCB | Configuration Control Board |
| CDR | Critical Design Review |
| CM | Configuration Management |
| CMMI | Capability Maturity Model® Integration |
| CMO | Configuration Management Officer |
| COTS | Commercial off the Shelf |
| CSCI | Computer Software Configuration Item |
| DCR | Discrepancy or Change Request |
| DM | Data Management |
| EPG | Engineering Process Group |
| EPR | Engineering Peer Review |
| FTE | Full-Time Equivalent |
| GOTS | Government off-the-Shelf |
| GPR | Goddard Procedural Requirements |
| GSFC | Goddard Space Flight Center |
| HCI | Human Computer Interface |
| ICD | Interface Control Document |
| IIR | Integrated Independent Review |
| IMTE | Inspection, Measuring and Test Equipment |
| ISD | Information Systems Division |
| ISO | International Standards Organization |
| ITA | Independent Technical Authority |
| IV&V | Independent Verification and Validation |
| LLIS | Lessons Learned Information System |
| MOTS | Modified off-the-Shelf |
| NASA | National Aeronautics and Space Administration |
| NCR | Nonconformance Reports |
| NCR/CA | Nonconformance Reporting/Corrective Action |
| NPD | NASA Policy Directive |
| NPG | NASA Procedures and Guidelines |
| NPR | NASA Procedural Requirements |
| ORR | Operational Readiness Review |
| PDL | Product Development Lead |

| | |
|---|---|
| PDR | Preliminary Design Review |
| PDT | Product Development Team |
| PM | Product Manager |
| PML | Product Maintenance Lead |
| PMT | Product Maintenance Team |
| QA | Quality Assurance |
| QMS | Quality Management System |
| RFA | Request for action |
| SCR | System Concept Review |
| SLOC | Source lines of code |
| SMP/PP | Software Management Plan/Product Plan |
| SMMP | Software Maintenance Management Plan |
| SRR | System Requirements Review |
| SSR | Software Specifications Review |
| STD | Standard |
| TBD | To be determined |
| URL | Uniform Resource Locator |
| WBS | Work breakdown structure |
| WOA | Work order authorization |

# Appendix B: System/Subsystem Classifications

*[Identify the classification of the overall software system in accordance with the software classification definitions for Class B and C software in Appendix B of NPR 7150.2. List the subsystems that comprise the system and identify the software classifications of each. Uniquely identify/highlight any subsystems containing safety-critical software.]*

| ***Software System*** | ***Subsystem Name*** | ***Class (A-H)*** | ***Safety-Critical?*** |
|---|---|---|---|
| | | | *[Y/N]* |
| | | | |
| | | | |
| | | | |

# Appendix C: Tailoring Matrix for Compliance with NPR 7150.2

*[This appendix contains the project's compliance matrix against the numbered, project-level software engineering (SWE) requirements in NPR 7150.2, including those requirements delegated to other parties or accomplished by contract vehicles. Compliance is marked with an "X" in the appropriate Class B and C columns, as shown in Appendix D of NPR 7150.2. Columns should be added for any software in Classes D to H.*

*If the software project has any variants, waivers, or exceptions to the requirements specified in NPR 7150.2, identify these in the right-hand column. These tailoring variations must be approved by the designated ITA. If a requirement may be met by following a Center-defined process (indicated by "P(Center,)" the applicable GSFC/ISD process asset has been identified.]*

***[This version of the project's compliance matrix is derived from the September 2004 version of NPR 7150.2. Please make changes to this matrix as needed to comply with the latest version of Appendix D of NPR 7150.2.]***

| Section of NPR | Requirement Descriptor | SWE Rqmt. | Class B | Class C | Class *[y]* | Tailoring Variants, Waivers or Exceptions |
|---|---|---|---|---|---|---|
| **Preface** | Effective Date | 1 | **X** | **X** | | |
| **Compliance with Laws, Policies, & Requirements** | SW Disclosures | 7 | **X** | **X** | | |
| | Export Control | 8 | **X** | **X** | | |
| | External Release | 9 | **X** | **X** | | |
| | Security | 10 | **X** | **X** | | |
| | Disabilities | 11 | **X** | **X** | | |
| | Disabilities | 12 | **X** | **X** | | |
| **SW Life Cycle Planning** | SW Plan | 13 | **X** | **X** | | |
| | Execute Plan | 14 | **X** | **X** | | |
| | Cost Estimation | 15 | **X** | **X** | | |
| | Schedule | 16 | **X** | **X** | | |
| | Training | 17 | **X** | **X** | | |
| | Reviews | 18 | **X** | **X** | | |
| | Life Cycle | 19 | **X** | **X** | | |
| | SW Classification | 20 | **X** | **X** | | |
| | SW Classification changes | 21 | **X** | **X** | | |
| | SW Assurance | 22 | **X*** | **P** (project) | | As defined in this SMP/PP. |
| | SW Safety | 23 | **X** | **X** | | |
| | Plan Tracking | 24 | **X** | **X** | | |
| | Corrective Action | 25 | **X** | **X** | | |
| | Changes | 26 | **X** | **X** | | |
| **Off-the-Shelf (OTS) SW** | COTS, GOTS, MOTS | 27 | **X** | **X** | | |

* This requirement can only be waived by the OSMA ITA.

| Section of NPR | Requirement Descriptor | SWE Rqmt. | Class B | Class C | Class *[y]* | Tailoring Variants, Waivers, or Exceptions |
|---|---|---|---|---|---|---|
| **Verification & Validation** | Verification planning | 28 | **X** | **X** | | |
| | Validation planning | 29 | **X** | **X** | | |
| | Verification results | 30 | **X** | **X** | | |
| | Validation results | 31 | **X** | **X** | | |
| **Project Formulation** | CMM L3 or CMMI L2 | 32 | **X**** | **P** (Center) | | |
| | Options for Acquisitions | 33 | **X** | **X** | | |
| | Acceptance Criteria | 34 | **X** | **X** | | |
| | Supplier Selection | 35 | **X** | **X** | | |
| | SW processes & tasks | 36 | **X** | **X** | | |
| | Milestone | 37 | **X** | **X** | | |
| | Acquisition planning | 38 | **X** | **X** | | |
| **Government Insight** | Insight into test | 39 | **X** | **P** (Center) | | GPR 5100.1, "Procurement" |
| | Electronic access | 40 | **X** | **P** (Center) | | GPR 5100.1, "Procurement" |
| | Open source | 41 | **X** | **P** (Center) | | GPR 5100.1, "Procurement" |
| | Source code access | 42 | **X** | **P** (Center) | | GPR 5100.1, "Procurement" |
| **Supplier Monitoring** | Track change request | 43 | **X** | **P** (Center) | | GPR 5100.1, "Procurement" |
| | SW measurement data | 44 | **X** | **X** | | |
| | Joint audits | 45 | **X** | **X** | | |
| | SW schedule | 46 | **X** | **X** | | |
| | Traceability data | 47 | **X** | **P** (Center) | | GPR 5100.1, "Procurement" |
| | Solicitation | 48 | **X** | **X** | | |
| **SW Requirements Development** | Document | 49 | **X** | **X** | | |
| | SW requirements | 50 | **X** | **X** | | |
| | Flow-down & derived req. | 51 | **X** | **X** | | |
| | Bi-directional trace | 52 | **X** | | | |
| **SW Requirements Management** | Manage req. change | 53 | **X** | **X** | | |
| | Corrective action | 54 | **X** | | | |
| | Requirements Validation | 55 | **X** | **X** | | |

** For Class B software, in lieu of a CMM/CMMI certification, the project will conduct an independent software capability evaluation in the seven process areas listed in SWE-32 and mitigate any risk, if deficient.

| Section of NPR | Requirement Descriptor | SWE Rqmt. | Class B | Class C | Class *[y]* | Tailoring Variants, Waivers, or Exceptions |
|---|---|---|---|---|---|---|
| SW Design | Document design | 56 | X | P (Center) | | GPR 8700.5, "In-House Development & Maintenance of Software Products" |
| | Architecture | 57 | X | P (Center) | | GPR 8700.5 |
| | Detailed design | 58 | X | | | |
| | Bi-directional trace | 59 | X | | | |
| SW Implementa-tion | Design ➔ code | 60 | X | X | | |
| | Coding standards | 61 | X | | | |
| | Unit test | 62 | X | X | | |
| | Version description | 63 | X | P (Center) | | PAL # 2.6.1.3, "ISD Product Release Letter" |
| | Maintain traceability | 64 | X | | | |
| SW Testing | Plan, procedures, reports | 65 | X | X | | |
| | Perform testing | 66 | X | X | | |
| | Test for compliance | 67 | X | X | | |
| | Evaluate test results | 68 | X | X | | |
| | Doc. defect & track | 69 | X | X | | |
| | Models, simulations, tools | 70 | X | | | |
| | Update plans & procedure | 71 | X | X | | |
| | Maintain traceability | 72 | X | X | | |
| | Platform or hi-fidelity simulation | 73 | X | X | | |
| SW Operations Maintenance, & Retirement | Document Maintenance plans | 74 | X | X | | |
| | Plan ops, Maint. & Retirement | 75 | X | X | | |
| | Implement plans | 76 | X | X | | |
| | Deliver software product | 77 | X | X | | |
| | As-built documentation | 78 | X | | | |
| SW Configuration Management | Develop CM plan | 79 | X | X | | |
| | Track & evaluate changes | 80 | X | X | | |
| | Identify SW configuration items | 81 | X | X | | |
| | Authorizing changes | 82 | X | | | |
| | Maintain records | 83 | X | X | | |
| | Configuration audits | 84 | X | | | |
| | Implement procedures | 85 | X | X | | |

| Section of NPR | Requirement Descriptor | SWE Rqmt | Class B | Class C | Class *[y]* | Tailoring Variants, Waivers, or Exceptions |
|---|---|---|---|---|---|---|
| **Risk Management** | Continuous Risk Management | 86 | **X** | | | |
| **Peer Reviews** | Requirements & Test plan | 87 | **X** | **P (Center)** | | |
| | Checklist, criteria, & tracking | 88 | **X** | **P (Center)** | | |
| | Basic measures | 89 | **X** | | | |
| **SW Measurement** | Objectives | 90 | **X** | **X** | | |
| | SW measurement areas | 91 | **X** | **P (Center)** | | |
| | Collection & storage | 92 | **X** | **X** | | |
| | Analyze data | 93 | **X** | **P (Center)** | | |
| | Report analysis | 94 | **X** | **P (Center)** | | |
| **SW Documen-tation Requirements** | SW Development Mgt. Plan | 102 | **X** | **P (Center)** | | PAL # 1.2.6.1, "ISD SMP/PP for Class B & C Software" |
| | SW Configuration Mgt. Plan | 103 | **P (Center)** | **P (Center)** | | PAL # 3.1, "ISD Software Configuration Management" |
| | SW Test Plan | 104 | **X** | **P (Center)** | | |
| | SW Maintenance Plan | 105 | **P (Center)** | | | |
| | SW Assurance Plan | 106 | **X** | | | |
| | SW Requirements Spec. | 109 | **X** | **P (Center)** | | |
| | SW Data Dictionary | 110 | **P (Center)** | | | |
| | SW Design Description | 111 | **X** | **P (Center)** | | |
| | Interface Design Description | 112 | **X** | **P (Center)** | | |
| | SW Change Request/ Problem | 113 | **X** | **P (Center)** | | |
| | SW Test Procedures | 114 | **X** | **P (Center)** | | |
| | SW Users Manual | 115 | **X** | | | |
| | SW Version Description | 116 | **X** | **P (Center)** | | PAL # 2.6.1.3, "ISD Product Release Letter" |
| | SW Metrics Report | 117 | **X** | **P (Center)** | | |
| | SW Test Report | 118 | **X** | **P (Center)** | | |
| | SW Inspection / Peer Review | 119 | **P (Center)** | | | |
| **Compliance** | Compliance Matrix | 125 | **X** | **X** | | This is the compliance matrix for the project. |